

## Changing explicit and implicit attitudes: the case of self-esteem

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Changing Explicit and Implicit Attitudes: The Case of Self-Esteem

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Changing Explicit and Implicit Attitudes:

The Case of Self-Esteem

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## Abstract

Three experiments investigated predictions concerning asymmetrical patterns of implicit and explicit self-esteem change. Specifically, we investigated the influence of knowledge about the own self that is momentarily salient as well as the influence of affective valence associated with the self in memory on implicit and explicit self-esteem. The latter was induced by evaluative conditioning, the former by directed thinking about oneself. We found that while evaluative conditioning changed implicit but not explicit self-esteem (Experiment 1), thinking about the own self altered explicit but not implicit self-esteem (Experiment 2). Moreover, in a third experiment, it could be shown that the effect of evaluative conditioning can spill over to the explicit level when participants are asked to focus on their feelings prior to making their self-report judgements (Experiment 3). Implications of our results are discussed in terms of recent controversies regarding dual process models of attitudes and associative versus propositional modes of information processing.

Keywords: self-esteem, implicit measures, explicit measures, directed thinking, evaluative conditioning, dual process models

## Changing Explicit and Implicit Attitudes:

## The Case of Self-Esteem

The understanding of the self is probably one of the oldest and most doggedly investigated problems in psychology. Based on the analysis of William James (1890) social psychologists have accumulated a number of empirical findings which added to our fundamental understanding of its structure and functioning (for an overview see Baumeister, 1998). A broad strand of research investigated the effects and benefits of self-esteem, that is, the global evaluation of the own self and the association of the own person with positive or negative attributes (Baumeister, 1998; von Collani & Herzberg, 2003) and the consequences it might have for a multitude of behavioural domains in life. High self-esteem is typically viewed as an indicator of psychological health and the popular media bombard people with the message that high self-esteem reflects optimal functioning and that it is a necessary precursor to productivity and happiness (Baumeister, 1998), but on the other hand it still remains unclear whether there are any causal relationships between self-esteem and psychological well-being (Baumeister, Campbell, Krüger, & Vohs, 2003). Nonetheless, many studies focused on possibilities to enhance the self-esteem level of individuals via different methods (success/failure feedback: Ybarra, 1999; mood induction: Brown & Mankowski, 1993; directed thinking tasks: McGuire & McGuire, 1996; social comparisons: Stapel & Blanton, 2004, etc.).

Although the understanding of the self and self-esteem in particular has witnessed important progress in the last decades (Baumeister, 1998), social psychology theorizing about the self experienced a shift in recent years. Drawing on the distinction between explicit and implicit attitudes (Wilson, Lindsey, & Schooler, 2000), many researchers distinguish between implicit and explicit self-esteem as well (Greenwald & Banaji, 1995). Whereas many researchers assume that explicit self-esteem, which can be measured by means of questionnaires, is conscious and deliberative in nature, they often regard implicit self-esteem

as the result of automatic self-evaluative processes that can be assessed with indirect measurement tools (Dijksterhuis, 2004; Greenwald & Farnham, 2000). Specifically, implicit self-esteem is often conceptualized as an automatically activated self-attitude (e.g., Greenwald & Banaji, 1995; Dijksterhuis, 2004) that is considered to have an automatic effect on the evaluation of self-associated and self-dissociated objects (Greenwald & Banaji, 1995). With regard to measures of implicit self-esteem, only the Name Letter Preference Task (Nuttin, 1985) and the Implicit Association Test (IAT; Greenwald, McGhee, & Schwartz, 1998) have demonstrated satisfactory reliability and validity (Bosson, Swann, & Pennebaker, 2000). A theoretical integration of implicit and explicit self-esteem is aspired in dual-process theories of social information processing, that we will describe in the following paragraph.

Numerous theorists have posited that individuals process information through two qualitatively different, but interacting, cognitive systems (e.g., Fazio, 1986; Fazio & Towles-Schwen, 1999; Gawronski & Bodenhausen, 2006; Rydell & McConnell, 2006; Sloman, 1996; Smith & DeCoster, 2000; Strack & Deutsch, 2004; see also Chaiken & Trope, 1999 for an overview). One mode of information processing is fast, operating mainly through automatic processes drawing on associative associations in memory. In contrast to this associative mode, the rule-based or propositional mode is slow, requires a large amount of cognitive capacity, is flexible and is assumed to be largely based on symbolic rules. This distinction in processing modes is also relevant to explicit and implicit self-esteem. While explicit self-esteem refers to the rule-based or controlled mode of thinking (according to dual-process models of social information processing); implicit self-esteem refers to the associative or automatic mode. Thus implicit self-esteem is regarded as the product of automatic, intuitive processing of affective experiences and it is at least partly influenced by social interactions in early life (DeHart, Pelham, & Tennen, 2006), whereas explicit self-esteem is attained through conscious and rational processing of self-relevant information.

As implicit and explicit attitudes are influenced by different processes (Gawronski & Strack, 2004, Olson & Fazio, 2006, Rydell & McConnell, 2006), asymmetric attitude changes may occur, which in turn can lead to discrepancies between implicit and explicit attitudes (Gawronski & Bodenhausen, 2006; Rydell, McConnell, Strain, Claypool, & Hugenberg, 2006). It can therefore be expected that this might be true for implicit and explicit self-esteem, too. That's why it seems to be a logical consequence that methods appropriate to change explicit self-esteem are not equally likely to influence implicit self-esteem as well. Further evidence for the assumption that implicit and explicit attitude changes are not symmetric stems from the Associative-Propositional Evaluation Model (APE-Model), that was recently proposed by Gawronski and Bodenhausen (2006). The model outlines the distinction between associative and propositional processes, a central distinction that has also been made by other dual-process-models in social cognition research (Smith & DeCoster, 2000; Strack & Deutsch, 2004). In particular, the associative processing mode can be characterized as activation of associations in memory, based on a spreading activation in a network. These associative processes are the basis for automatic affective reactions toward certain attitude objects, and can be assessed with indirect measures. The deliberative propositional processing mode can be described as flexible and highly adaptable to currently considered knowledge. It results in an evaluative judgment that can be captured with direct measures. Consequently, it is assumed that changes in associative knowledge structures should lead to changes in implicit attitudes in general and thus in implicit self-esteem whereas changes in propositional knowledge should lead to changes in explicit attitudes and hence in explicit self-esteem. Because it is believed that the information underlying explicit attitudes is introspectively accessible, people should be able to articulate reasons for their attitudes. Since the associative mode operates through automatic processes, it is assumed that individuals are not aware of the processes underlying implicit attitudes themselves. However, they may sometimes be aware of the product of processing – the automatic affective reaction (i.e., a positive or negative

feeling or intuition; Gawronski & Bodenhausen, 2006). According to Gawronski and Bodenhausen (2007) the automatic affective reaction can be transferred into a propositional format. In this case and if the automatic affective reaction is regarded as valid, individuals may rely on their intuition of their implicit attitudes when forming explicit evaluations (Gawronski & Bodenhausen, 2006; Strack & Deutsch, 2004). Under these circumstances we may find corresponding changes in implicit and explicit self-attitudes in general and in implicit and explicit self-esteem in particular.

It has already been shown in the literature that some manipulation methods may have an influence on indirectly assessed self-esteem but did not affect self-reported self-esteem. Baccus, Baldwin, and Packer (2004), for instance, presented participants with a computer game in which self-relevant information was repeatedly paired with smiling faces, and found an increase in implicit self-esteem but not in explicit self-esteem. However, most studies investigating changes in explicit or implicit self-esteem used only one type of measurement tool: Either they employed direct measures to assess changes in explicit self-esteem (e.g., McGuire & McGuire, 1996; Riketta & Dauenheimer, 2003; Ybarra, 1999) or they used indirect measures to see whether changes in implicit self-esteem occurred after the manipulation (Dijksterhuis, 2004). Hence, the study conducted by Baccus et al. (2004) is a positive exception in this research area, but a shortcoming is that the main focus of their study was to modify self-esteem in general and that they did not consider a possible dissociation between implicit and explicit self-esteem. Therefore, a study is needed in which experimental manipulations are introduced to systematically modify implicit and explicit self-esteem independently of each other. Empirical results indicating a dissociation of changes in explicit and implicit self-attitudes may then be taken as a support of theoretical models that distinguish different processing modes as basis for this kind of dissociation.

#### *Goals of the Present Research*



The present research was designed to shed some more light on the convergence or dissociation of changes in explicit or implicit self-esteem. Based on the above mentioned dual-process models we investigated the conditions under which an appropriate experimental manipulation would lead to a change of implicit but not explicit self-esteem (Experiments 1 and 3), or would result in a modification of directly but not indirectly assessed self-esteem (Experiment 2). Specifically, we hypothesized that people exposed to, or are asked to retrieve information about the self would report a different explicit evaluation of the self while automatic self-evaluations should remain unchanged. In contrast, if an appropriate manipulation leads to changes in the structure of self-related associations in memory this should alter automatic evaluations of the self but not deliberative self-related judgements as long as the propositional image or intuition of the implicit attitude towards the self is regarded as inadequate source of the explicit self-evaluation. We designed three experiments to test our assumptions. The first experiment was conducted with the aim of providing evidence whether implicit self-esteem could be enhanced by changing the structure of affective associations in memory while explicit self-esteem should not be affected. An evaluative conditioning procedure was used for this purpose. In the second experiment, in contrast, we investigated if a directed thinking manipulation which is assumed to have an impact on propositional processing would result in a change of directly but not indirectly assessed self-esteem. Finally, in the third experiment, we investigated whether changes in implicit self-esteem can spill over to the level of explicit self-esteem, given appropriate conditions as specified by the APE-Model (Gawronski & Bodenhausen, 2006).

### Experiment 1

Experiment 1 was done in an attempt to test the prediction that changes in implicit self-esteem but not explicit self-esteem should emerge when a condition is introduced that influences the structure of associations in memory, and hence the automatic affective reactions, resulting from these associations (Gawronski & Bodenhausen, 2007). To address

these self-relevant associations, a subliminal evaluative conditioning procedure (EC) was used, because it (1) is typically regarded as an associative learning procedure (see De Houwer, Thomas, & Baeyens, 2001; Walther, Nagengast, & Trasselli, 2005), (2) has been found to influence implicit self-esteem in earlier experiments (e.g., Dijksterhuis, 2004), and (3) has been found that EC effects occur without the awareness of the stimulus pairings. The idea behind EC is that pairings of an attitude object (conditioned stimulus or CS) with other stimuli of a certain valence (unconditioned stimulus or US) will change the attitude towards the attitude object in the direction of the stimuli it has been paired with. Hence, in Experiment 1, some participants were repeatedly presented with trials in which the word “I” was paired with positive words (experimental condition) while the other half of the participants worked on trials in which the word I was repeatedly paired with neutral words (control condition).

Based on the considerations outlined above, we expected an EC effect to emerge only for implicit self-esteem, but not with respect to explicit self-esteem. Specifically, we hypothesized that implicit self-esteem should be more favourable in the experimental condition compared to the control condition. In contrast it was predicted that explicit self-esteem judgements would be unaffected by the EC manipulation (see Baccus et al., 2004).

### *Method*

*Participants and Design.* 80 undergraduate psychology-students (70 women and 10 men) of the University of Leipzig participated in the experiment in exchange for course credit. Their mean age was 23.3 years ( $SD = 4.76$ ), and they were randomly assigned to either the experimental or the control condition.

*Materials.* Evaluative conditioning: The procedure of the EC paradigm was similar to the one employed by Dijksterhuis (2004): It involved a subliminal presentation of the CS as well as a subliminal presentation of positive or neutral US. As CS, we used the German word for “I” (Ich), as US we used positive adjectives and neutral non-words. The evaluative conditioning task was masked as a lexical decision task with 30 trials, preceded by two trials

designed as training. On each trial, participants were first presented with a masking stimulus (i.e., a row of Xs) that appeared for 500 ms on the computer screen. The row of Xs was then replaced by the CS which was presented for 17ms. Depending on condition, positive adjectives or neutral non-words appeared on the screen for 17ms immediately afterwards. In the experimental condition, the CS was always followed by positive trait words. 15 different traits were used<sup>1</sup>. Each word was presented twice during the 30 trials. In the control group the word “I” was always paired with one of 15 evaluative neutral non-words. The US was then replaced by a random letter string. Participants’ task was to decide whether this random letter string began with a consonant or with a vowel. To indicate their answer they were asked to press either the “A” key for a vowel or the “L” key for a consonant. As soon as participants pressed one of the two keys the random letter string disappeared and the next trial began. All words were presented in white letters on a black screen.

Measures of Self-Esteem: Participants’ implicit self-esteem<sup>2</sup> was assessed with a German version of the self-esteem IAT (Greenwald & Farnham, 2000). The IAT procedure consisted of seven blocks separated by a short pause for instructions. In the first block, twelve stimuli characterizing the individual participant (family name, own Christian name, month of birth, place of birth, gender, zodiac) or a completely different person (different family name, different Christian name, etc.) had to be assigned to categories “Self” or “Other”, respectively. Participants were asked to press a left-hand key when a stimulus characterizing the own person appeared on the screen and a right hand key when a stimulus characterizing another person appeared. In the second block participants had to discriminate between the categories “Positive” and “Negative” by classifying six positive (left-hand key) and six negative (right-hand key) adjectives according to their category membership<sup>3</sup>. In the first combined blocks (Block 3 and 4), participants were presented with the six positive words, the six negative words, the six self-related words and the six other-related words. Participants had to press a left-hand key whenever a positive or self-related word appeared, and to press a right-hand key

whenever a negative or other-related word appeared. Throughout this task, the category labels “Self” and “Positive” remained on the left-hand side of the screen and the category labels “Other” and “Negative” on the right-hand side. In Block 5, the initial attribute discrimination task (i.e., Block 2) was repeated with a switch of the categorization keys. In Block 6 and 7 the combined task was repeated, this time, however, participants had to press the left-hand key whenever a self-related or a negative word appeared on the screen, and they had to press the right-hand key when either an other-related or a positive word was presented. The order of the presentation of the single stimuli in each block was randomized, but all participants went through the IAT blocks in the same order.

To measure participants’ explicit self-esteem a semantic differential and a German version (Schütz, 1996) of the state-self-esteem scale (Heatherton & Polivy, 1991) were used. With regard to the first measure, six pairs of polar-opposite adjectives were presented (i.e., pleasant-unpleasant, valuable-useless, nice-awful, high-low, good-bad and successful-unsuccessful), and participants were asked to describe themselves on each adjective pair by checking one of the points on a 7-point response scale between the adjectives that would resemble their self-evaluation. The scale to assess state-self-esteem consisted of 20 items representing three dimensions of state-self-esteem (social self-esteem, performance self-esteem and self-esteem regarding the own appearance). The items had to be answered on a five-point scale ranging from 1 (*completely false*) to 5 (*completely true*).

*Procedure.* Upon entering the laboratory, subjects were welcomed by a female experimenter and seated in front of a computer. Written instructions explained that they would be taking part in a study on person perception. Participants then completed the lexical decision task that included the evaluative conditioning. Thereafter, participants completed the indirect and direct measures of self-esteem. The order of the two measures was counterbalanced across participants. At the end of the session, participants were debriefed carefully. Specifically, they were asked whether they had seen anything unusual during the

lexical decision task, and they were asked if they had seen any flashes on the screen. No participant showed any suspicion, and no participant had seen any flashes.

### *Results and Discussion*

An initial analysis established that the order of the presentation of the indirect and direct measures neither had a significant impact on the IAT-effect nor on self-reported self-esteem. Consequently this factor was omitted from further analyses.

*Explicit Self-Esteem.* We computed two indices of participants' explicit self-esteem: The first index was calculated by summing up subjects' responses to the semantic differential (Cronbach's  $\alpha = .75$ ), and the second was computed by summing up the responses to the 20 state-self-esteem-scale items (Cronbach's  $\alpha = .81$ ). Table 1 gives the scores and standard deviations of both measures in the different experimental conditions. As a simple inspection of the means reveals, the evaluative conditioning procedure had no impact on the self-report measures. A one-way analysis of variance (ANOVA) with type of conditioning as the between-subjects factor supported this impression by revealing neither a significant main effect for conditioning on state self-esteem nor on the semantic differential ( $F_s < 1.8$ ).

*Implicit Self-Esteem.* The IAT data were computed according to the improved scoring algorithm proposed by Greenwald, Nosek, and Banaji (2003). Specifically, the  $D_1$ -measure with a built-in error penalty was chosen. IAT scores were calculated such that higher scores indicate a stronger association between self and positive aspects. Furthermore, we calculated the reliability of the IAT- $D_1$ -effects by applying the algorithm separately to two mutually exclusive subsets of trials of the IATs. The Spearman-Brown adjusted split-half correlation was  $r_{tt} = .74$ . The means and standard deviations are given in Table 1. As can be seen, the IAT effect was more pronounced in the experimental condition compared with the control condition, indicating that evaluative conditioning had the expected effect on implicit self-esteem. Supporting this impression, a one-way analysis of variance (ANOVA) with

Conditioning as the between-subjects factor yielded a significant main effect of Conditioning ( $F(1, 76) = 13.32, p < .01, \eta^2 = 0.15$ ).

To sum up the results of Study 1, we found clear evidence for a conditioning effect on indirect self-esteem measures, but not on self-reported self-esteem. Thus, consistent with earlier experiments (e.g., Baccus et al., 2004), an asymmetrical pattern of self-esteem change was found after evaluative conditioning. This asymmetrical pattern of changes was also displayed in the correlations between implicit and explicit self-esteem measures (IAT and semantic differential:  $r = .13$ , IAT and state-self-esteem:  $r = -.06$ ). In contrast the two explicit measures correlated with an  $r = .62, p < .01$ .

### Experiment 2

While Experiment 1 established that implicit self-esteem can be enhanced using an evaluative conditioning procedure, the second experiment sought to provide evidence that an appropriate experimental manipulation might influence explicit self-esteem while leaving implicit self-esteem unchanged. According to the assumptions outlined above, this should be the case when participants are asked to retrieve evaluative information about the self. Specifically, when the information they have deliberately retrieved is inconsistent with their original judgement of the self (e.g., retrieval of negative information and a positive self-view), this should promote a different judgement. If the information, in contrast, is consistent, this should leave the original judgement unchanged or might lead to a polarized judgment (e.g., retrieval of positive information and a positive self-view). However, since the additional consideration of new or additional information should have no direct or immediate effects on automatic evaluations or the structure of associations in memory, no change in implicit self-evaluations was expected.

The manipulation that was intended to change the focal set of information was a directed thinking task originally employed by McGuire and McGuire (1996). In their research some subjects were asked to list characteristics that they possessed, and others were asked to list

characteristics that they lacked. Additionally, some participants listed desirable characteristics and some listed undesirable characteristics. McGuire and McGuire (1996) found that thinking about desirable characteristics possessed or undesirable characteristics lacked, lead to an increase in self-reported self-esteem while a decrease was found when participants listed desirable characteristics that they lacked or undesirable characteristics that they possessed.

In order to test our assumptions, participants in our experiment were asked – similar to McGuire and McGuire (1996) – to name characteristics that they possess or that they lack, respectively. Additionally, some were asked to list desirable characteristics and others were asked to list undesirable characteristics. Afterwards, all participants completed a direct and an indirect measure of self-esteem. Based on the considerations outlined above, we expected to find a self-esteem change in direct, but not in indirect measures of self-esteem. More precisely, explicit self-esteem was predicted to be higher when participants were asked to list undesirable characteristics that they lack or to generate desirable characteristics that they possess, compared to listing undesirable characteristics that they possess or desirable characteristics that they lack. Implicit self-esteem, in contrast, was expected to be unaffected by the directed thinking manipulation.

### *Method*

*Participants and Design.* 80 psychology undergraduates (60 women and 20 men) of the University of Leipzig participated in the experiment in exchange for course credit. Their mean age was 23.3 years ( $SD = 5.77$ ). They were randomly assigned to one of four experimental conditions defined by a 2 (Possession: possessed vs. lacked)  $\times$  2 (Type of Characteristic: desirable vs. undesirable) between-subjects design.

*Materials.* Directed thinking task: To influence participants' explicit self-esteem we used the directed thinking task originally employed by McGuire and McGuire (1996). Participants were given one of four thought-generating tasks defined by the 2  $\times$  2 Design. That is, they were asked to “write down as many desirable (undesirable) characteristics as you

can that you do (do not) have”. In each condition, one of these four instructions was printed on the top of the page, while the rest of the page contained 20 empty lines. Participants were given a three minute allowance to list the requested information.

**Measures of Self-Esteem:** We used the same IAT and the same explicit self-esteem measures as in Experiment 1. To control for possible effects of our manipulation on participants’ mood, they were additionally asked to complete a German version of the Positive and Negative Affect Schedule (PANAS; Krohne, Egloff, Kohlmann, & Tausch, 1996) which consists of twenty mood-describing adjectives. The items had to be answered on a five-point scale indicating how much each item described the participant’s mood at the moment from 1 (*not at all*) to 5 (*completely*).

*Procedure.* When participants arrived, they were welcomed by a female experimenter and were seated in front of a computer. Participants began the experiment with the directed thinking task. Then, they were asked to take an unrelated filler questionnaire. This task lasted approximately five minutes. Afterwards all participants answered the PANAS. Thereafter, participants completed the indirect and direct self-esteem measures, whereby the order of the direct and indirect self-esteem measures was counterbalanced across participants. Finally, participants were debriefed and thanked for their participation.

### *Results and Discussion*

Preliminary analyses were performed to examine if the order of the presentation of the implicit and explicit measure on the dependent variables. No test involving this variable was statistically significant. Hence, the remaining tests were performed by pooling across the order factor.

*Explicit Self-Esteem.* As before, we computed two indices of participants’ explicit self-esteem. While the first index was calculated by summing up subjects’ responses to the semantic differential (Cronbach’s  $\alpha = .69$ ), the second was computed by summing up the responses to the 20 state-self-esteem-scale items (Cronbach’s  $\alpha = .85$ ). Table 2 gives the



scores and standard deviations of both measures in the different experimental conditions. As the pattern of means in Table 2 shows, the directed thinking task had the expected effect: Participants who listed desirable characteristics that they possessed, and subjects who reported undesirable characteristics that they lacked showed higher values in self-reported self-esteem than participants in the other two conditions. A 2 (Possession)  $\times$  2 (Type of Characteristic) between-subjects ANOVA using the sum scores of the semantic differentials as dependent variable supported this impression by yielding a significant interaction between the factors Possession and Type of Characteristic,  $F(1, 76) = 9.73, p < .01, \eta^2 = 0.11$ . No significant main effect of Possession emerged ( $F < 1$ ), but the main effect of Type of Characteristic was marginally significant ( $F(1, 76) = 2.93, p = .09, \eta^2 = 0.04$ ). Similar results were obtained for the second explicit self-esteem score, albeit the effect was somewhat weaker: A 2 (Type of Characteristic)  $\times$  2 (Possession) between-subjects ANOVA yielded no significant main effects ( $F_s < 1.5$ ), but a significant interaction,  $F(1, 76) = 7.00, p = .01, \eta^2 = 0.08$ . Because the Levene-Test checking for symmetrical error variances yielded that the standard deviations were not identical in the four experimental groups we computed planned linear contrasts with a control for variance inhomogeneity. The participants who were instructed to think about positive aspects of their selves (desirable characteristics possessed, undesirable characteristics lacked) proved higher values in explicit self-esteem than the participants of the other two groups (semantic differential:  $t(55.28) = 3.12, p < .01, r_{\text{effect}} = 0.33$ , state-self-esteem-Scale:  $t(58.96) = 2.65, p = .01, r_{\text{effect}} = 0.29$ ). The results of this analysis support the results of the ANOVA.

*Influences of Mood.* To check whether changes in participants' explicit self-esteem were mediated by changes in their mood (positive or negative affect), we additionally performed a mediation analysis in which the contrast-coded independent variable and participants' mood ratings (positive and negative affect) were used to predict subjects' self-reported self-esteem. This analyses yielded no significant results, however (Aroian variant of the Sobel-Test for

positive affect: semantic differential:  $z = 1.05, p = .29$ ; state-self-esteem-scale:  $z = 1.11, p = .27$ ; Aroian variant of the Sobel-Test for negative affect: semantic differential:  $z = 0.18, p = .86$ ; state-self-esteem-scale:  $z = 0.19, p = .85$ ).

*Implicit Self-Esteem.* As in Experiment 1, we used the  $D_1$ -algorithm to aggregate the IAT data (Greenwald et al., 2003), and IAT scores were calculated such that higher scores indicate a stronger association between self and positive aspects. Further analyses ensured sufficient reliability of the IAT- $D_1$ -effects. When we applied the algorithm separately to two mutually exclusive subsets of trials, the Spearman-Brown adjusted split-half correlation was  $r_{tt} = .74$ . Table 1 gives the means and standard deviations of IAT scores. Submitted to a 2 (Type of Characteristic)  $\times$  2 (Possession) between-subjects ANOVA, IAT scores revealed neither significant main effects nor a significant interaction ( $F_s < 1.1$ ).

The correlations between implicit and explicit self-esteem measures were:  $r = .00$  (IAT and semantic differential) and  $r = -.23, p < .05$  (IAT and state-self-esteem), respectively. The two explicit measures of self-esteem correlated with an  $r = .48, p < .01$ .

In sum, the pattern of results is consistent with McGuire and McGuire's (1996) finding and with our hypotheses. Specifically, explicit self-esteem was higher in the conditions in which participants were asked to list desirable characteristics that they possess or undesirable characteristics that they lack, respectively, compared with participants in the other two conditions. Implicit self-esteem, in contrast, was unaffected by this manipulation. Taken together, the results of Experiment 2 offer convincing evidence for the hypotheses that a condition which affects momentarily activated propositional self-knowledge leads to explicit but not to implicit self-esteem change. Consequently our results support the claim that explicit self-esteem is influenced by changes in propositional knowledge whereas the results illustrate that changes in propositional processes did not alter implicit self-esteem. However, it might be possible that manipulations of propositional knowledge, which are of stronger intensity or

duration, would also alter implicit self-esteem (cf., Rydell et al., 2006 for an example concerning attitudes toward a fictive person called Bob).

### Experiment 3

While Experiment 1 and Experiment 2 established asymmetrical patterns of self-esteem change (either implicit or explicit self-esteem were influenced), Experiment 3 was conducted with the aim to investigate if changes in implicit self-esteem can be transferred to the explicit level. With the help of the evaluative conditioning procedure (see Experiment 1) we influenced the structure of positive associations that are related to the self in people's minds. Drawing on the assumptions of the APE-Model these associations can be used as a basis for explicit judgements about the own self if they are considered as correct. On the other hand these associations may also be rejected as a basis for explicit judgements if they are considered as incorrect, false or invalid. Based on these ideas we postulated that it should be possible to transfer the changes that the EC procedure caused in implicit self-esteem to the level of explicit self-esteem. But therefore we had to ensure that participants relied on their automatic affective reactions as basis for their evaluative self-judgment. In accordance with previous research (Wilson, Dunn, Kraft, & Lisle, 1989) it was hypothesised that thinking about feelings would enhance the salience of the automatic affective reaction and would thus cause participants to ground their explicit self-judgments on the affective reaction. Consequently an increase in the level of explicit self-esteem should be detectable.

On the other hand it was expected that focusing on further self-knowledge or thinking about self-knowledge would decrease the influence of the automatic affective reaction because the automatic affective reaction might be rejected as a valid basis for the explicit self-judgment and participants might base their judgment on the retrieved self-knowledge. Hence, the positive automatic affective reaction after a positive evaluative conditioning will not be taken as a basis for an evaluative judgement and the level of explicit self-esteem will not change in this condition.

Recent research by Gawronski, LeBel, Heilpern, and Wilbur (2007) supports these contentions for prejudice. In their experiment, some participants were asked to take a positive evaluative conditioning procedure concerning Asia and a negative one concerning Europe (evaluation of the concepts was counterbalanced across participants). Afterwards, some were asked to focus on their feelings while others were asked to focus on their knowledge concerning the attitude object Asia. The results showed that evaluative conditioning led to more positive implicit attitudes towards Asia irrespective of the introspection manipulation. In contrast, explicit attitudes were only affected when individuals were asked to focus on their feelings towards Asia, but not when they were asked to focus on their knowledge towards Asia. Thus, asking participants to focus on their feelings led to a transfer of the evaluative conditioning effect on explicit attitudes.

Taken together, we expected to find self-esteem changes in indirect self-esteem measures (cf., Experiment 1) irrespective of whether subjects focused on their feelings or their knowledge. In contrast, we predicted a change in explicit self-esteem following a positive evaluative conditioning procedure if participants were asked to focus on their feelings toward themselves, because in this manipulation condition participants should ground their explicit self evaluation on their automatic affective reaction. Such a transfer effect was not expected when participants were asked to focus on their knowledge about the self, because under this condition the automatic affective reaction would be rejected as a valid basis of the explicit self-judgment.

### *Method*

*Participants and Design.* A total of 64 participants (38 women, 26 men) participated in the experiment. Their mean age was 24.2 years ( $SD = 6.61$ ), and they were randomly assigned to one of four experimental conditions defined by a 2 (Conditioning: positive vs. negative)  $\times$  2 (Introspection: feeling vs. knowledge) between-subjects design.

*Materials.* We used the same indirect and direct measures of self-esteem as in Experiment 1 and 2. Furthermore, the evaluative conditioning procedure was exactly the same as in Experiment 1.

*Introspection manipulation:* The introspection manipulation largely resembled the one employed by Gawronski et al. (2007). Specifically, half of the participants were asked to: “Take a few minutes to think about your momentary feelings toward yourself.” (i.e., feeling condition) while the remaining half was asked to: “Think about knowledge that you have about yourself.” (i.e., thinking condition). Participants in both conditions were instructed to write down their thoughts on a sheet of paper.

*Procedure.* Upon arrival at the laboratory, participants were welcomed by a female experimenter and seated in front of a computer. Participants first completed the lexical decision task that included the evaluative conditioning. Thereafter, participants were asked to take the introspection task, and then to complete the implicit and the explicit self-esteem measures, whereby the order of the two measures was counterbalanced across participants. Finally, participants were debriefed carefully. Specifically, they were asked whether they had seen anything unusual during the lexical decision task, and they were asked if they had seen any flashes on the screen. No participant showed any suspicion, or had seen any flashes.

### *Results and Discussion*

As in Experiment 1 and 2, preliminary analyses established that the order of presentation of the explicit and implicit self-esteem measures had no significant effect on the dependent measures. Consequently, the remaining analyses were done pooling across this factor.

*Implicit Self-Esteem.* As in Experiments 1 and 2 the data were aggregated using the  $D_1$ -scoring algorithm proposed by Greenwald et al. (2003) so that higher scores indicate a higher implicit self-esteem (see Table 3 for means and standard deviations). Furthermore, we calculated the Spearman-Brown adjusted split-half correlation as a measure of the reliability of the IAT ( $r_{tt} = .74$ ). To analyse if our manipulations had the intended effects, the IAT scores

were submitted to a 2 (Introspection)  $\times$  2 (Conditioning) between-subjects ANOVA. As expected, a significant main effect of Conditioning emerged,  $F(1, 60) = 6.09, p = .02, \eta^2 = 0.09$ , indicating a higher implicit self esteem after a positive evaluative conditioning of the self ( $M = 0.66$ ) compared to the neutral evaluative conditioning group ( $M = 0.50$ ). Neither a main effect of the Introspection factor nor an interaction effect of Introspection and Conditioning emerged ( $F_s < 1$ ).

*Explicit Self-Esteem.* The means of the sum-scores and standard deviations are presented separately for the evaluative conditioning and introspection groups (see Table 3). The internal consistencies of the explicit self-esteem measures were quite different this time (semantic differential  $\alpha = .59$ , state-self-esteem scale  $\alpha = .83$ ). In order to test the effects of the evaluative conditioning manipulation and the introspection manipulation on explicit self-esteem we submitted the two indices of explicit self-esteem separately to a 2 (Introspection)  $\times$  2 (Conditioning) univariate analysis of variance (ANOVA) with both factors as between-subject factors. For the sum-scores of the state-self-esteem-scale the analysis revealed a significant interaction between both factors ( $F(1, 60) = 4.29, p = .04, \eta^2 = 0.07$ ) and no significant main effects ( $F_s < 2.11, df = 1 / 60, ps > .15$ ). An inspection of the means indicated that the evaluative conditioning manipulation had an effect on explicit self-esteem only if participants focused on their feelings, but not when they were asked to focus on knowledge about themselves. Specifically, participants in the feelings condition showed higher values in explicit self-esteem under positive evaluative conditioning ( $M = 79.87$ ) than under conditioning with evaluative neutral non-words ( $M = 71.69$ ),  $t(30) = 2.72, p = .01, d = 0.96$ . On the other hand, no such difference of conditioning manipulation could be observed for participants in the thinking condition,  $t < 1$ . In accordance with our hypothesis, a planned linear contrast revealed that participants in the positive evaluative conditioning group who were thinking about feelings exhibited the highest values in explicit self-esteem compared to the other three experimental groups ( $t(60) = 2.55, p = .01, r_{\text{effect}} = 0.31$ , contrast weights +3, -

1, -1 und -1), whereas the other three groups did not differ significantly (all  $t$ s < 1). For the semantic differential scores, however, no significant main effects for Introspection ( $F(1, 60) = 2.64, p = .11, \eta^2 = 0.04$ ) and Evaluative Conditioning ( $F < 1$ ) were found and no significant interaction was observed ( $F < 1$ )<sup>4</sup>.

*Correlations.* Overall we found no notable correlations between explicit and implicit self-esteem in the whole sample measures (IAT and semantic differential:  $r = -.04$ , IAT and state-self-esteem:  $r = -.05$ ).

In sum, the results from Experiment 3 replicated and extended the results from Experiment 1. In particular, the evaluative conditioning procedure influenced implicit self-esteem regardless of whether participants focused on their feelings concerning themselves or on their knowledge about themselves. In contrast, explicit self-esteem was affected by the evaluative conditioning procedure only when participants focused on their feelings, but not when they focused on their knowledge: Subjects in the former condition judged themselves more favourably after a positive evaluative conditioning of the self than participants in the latter condition. Thus, consistent with our assumptions and with the results of Gawronski et al. (2007), implicit self-esteem was transferred to the explicit level when participants' focus was directed to their immediate affective reaction regarding themselves, but not when they considered additional pieces of information when making their judgements.

### General Discussion

Based on recently proposed dual-process models, we investigated the conditions under which implicit but not explicit self-esteem or explicit but not implicit self-esteem could be changed, given appropriate manipulations that can be assumed to have an impact on the cognitive processes (propositions or associations) involved. Specifically, we assumed that evaluative conditioning should lead to an alteration in implicit but not explicit self-esteem, while a directed thinking task should change explicit but not implicit self-esteem.

The results of our experiments supported our contentions: Participants who were asked to complete a subliminal evaluative conditioning (EC) procedure in which a self-relevant stimulus was repeatedly paired with positive words showed an increase in implicit self-esteem (measured by means of an IAT), compared to participants in the control condition.

Additionally, their directly assessed self-esteem (state-self-esteem scale) was unaffected by the EC manipulation (Experiment 1). In contrast, asking participants to list desirable or undesirable characteristics that they possess or that they lack, respectively, led to a change in self-reported self-esteem but not in indirectly assessed self-esteem. Thus, consistent with the assumptions of recent dual-process models (Gawronski & Bodenhausen, 2006; Rydell et al., 2006), implicit self-esteem was affected when an associative learning procedure was used to modify self-related evaluative associations in memory while explicit self-esteem was influenced when the salience of self-relevant information was manipulated (Experiment 2).

Experiment 3 built on the successful enhancement of implicit self-esteem through evaluative conditioning, assuming that the change in implicit self-esteem will subsequently be transferred to explicit self-esteem. Conceptually, the basic idea was to enhance the participants' focus on their affective reactions by making them think about their *feelings* towards themselves (Gawronski & Bodenhausen, 2006; Gawronski et al., 2007) as opposed to letting them to think about their knowledge concerning themselves. The results of Experiment 3 indicate that this manipulation was successful: Asking participants to think about their feelings but not the consideration of knowledge led to an increase in implicit *as well as* explicit self-esteem.

In sum, our results show that implicit self-esteem is enhanced when an associative learning procedure is used leaving explicit self-esteem unchanged, while explicit self-esteem can be influenced when a manipulation directed at propositional thinking is introduced which does not affect implicit self-esteem. Our results of Experiment 1 are in accordance with the results of Rydell et al. (2006), who demonstrated that a subliminal conditioning task has the



potential to alter implicit attitudes, whereas explicit attitudes remained unchanged. Of course one might object that explicit attitudes could have changed as well after manipulating the associative structure of self-evaluations. Following the theoretical rationale of dual-process models, especially the APE-Model, it is possible that a change in associative structures can result in a change in propositional processes as well. However, this will only happen if a person recognizes these changes (cf., Experiment 3 – focusing on feelings). The APE-Model postulates that the automatic affective reaction has the potential to enter consciousness and that it can be transferred into a propositional format, but an influence on the explicit judgment will only occur if a person trusts and relies on this affect. This was the case in Experiment 3 where such an effect could be demonstrated.

A similar objection could be articulated with respect to Experiment 2. Specifically, one could argue that a manipulation directed at propositional knowledge should also alter implicit self-esteem. For instance, thinking about the self could also strengthen or weaken associations between the self and positivity or negativity. But this is empirically seldom the case, as Gregg, Seibt, and Banaji (2006) or Rydell et al. (2006) demonstrated. These authors showed that changes in propositional knowledge about a certain person or group do not necessarily affect implicit attitudes. Rather a transfer from the implicit to the explicit level is time consuming and needs lots of learning trials. These conditions were not given in our second experiment, as participants considered eight to ten characteristics on average.

On a more general level, our results fit nicely with the assumptions of recently proposed dual-process models like the Reflective-Impulsive Model (RIM) of Strack and Deutsch (2004) or the Associative-Propositional Evaluation Model by Gawronski and Bodenhausen (2006). They seem, however, to be inconsistent with dual-process models which assume that implicit attitudes assessed with indirect measures are highly stable and difficult to change (see Wilson et al., 2000; Petty, Tormala, Brinol, & Jarvis, 2006), because these models can not account for an asymmetrical pattern of self-esteem change that involves an alteration of implicit but not

explicit self-esteem (see Experiment 1 or 3, respectively). The RIM or the APE-Model, in contrast, allow for such patterns. The APE-Model, for instance, states that attitudes (concerning oneself or other entities), have their roots in two different types of mental processes, an associative and a propositional one. Whereas the former reflects spontaneous affective reactions to an attitude object that are typically assessed by means of indirect measures, the latter builds the basis for evaluative judgements whose outcomes are assessed with self-report measures. Given that the propositional image of affective reactions is sometimes inconsistent with other propositions that are considered for a judgement, the APE-model can not only explain why implicit and explicit attitudes might be dissociated, but also when and under which circumstances asymmetrical patterns of attitude change should emerge (Gawronski & Bodenhausen, 2006, 2007). For example, if a manipulation method changes the affective reaction toward an attitude object, and other relevant propositions are inconsistent with this evaluation, the manipulation should affect implicit but not explicit attitudes. In contrast, if a certain manipulation influences the propositions that are considered for a judgement, but there is no influence on the associative processes, this manipulation should influence explicit but not implicit attitudes. Our results support these assumptions.

Nonetheless, it has to be pointed out that our results are not only suggestive for the RIM- or the APE-Model, respectively. Most of the currently popular dual-process models could integrate our findings into their assumptions and it is difficult to test these models against each other, because many predictions concerning the change of self-esteem in particular and of attitudes in general can be derived from more than one dual-process model. Although we can not plead for one particular dual-process model to be the best in integrating our findings we can clearly articulate that our findings are not compatible with the assumptions of Wilson et al. (2000), who postulate that implicit attitudes are hardly changeable. This assumption is challenged by the results of Experiments 1 and 3, indicating changes in implicit, but not necessarily explicit self-esteem after an evaluative conditioning manipulation.

Our results did not only offer clear evidence for asymmetrical patterns of change in implicit and explicit self-esteem, but they also demonstrated that a transfer of manipulation effects is possible. Specifically, the results of our third experiment support the idea that an emotion based focus enables a transfer of the effects of evaluative conditioning on implicit self-esteem to explicit self-esteem. Comparable results were recently presented by Egloff, Weck, and Schmukle (in press), who demonstrated stronger correlations between implicit and explicit anxiety after thinking about anxiety related situations. In connection with the transferability of effects of a certain manipulation method from implicit to explicit self-esteem, the question of awareness of implicit/explicit self-esteem is really central. While some researchers argue that people can be aware of their implicit attitudes, others posit that implicit attitudes are unconscious (see De Houwer & Moors, 2007). From our point of view it seems to be more fruitful to define implicit attitudes as accessible to consciousness in a certain manner. Whether this consciousness is limited to an intuition or a feeling can not be answered with the help of our data and should be addressed in future research. A first study on this issue comes from Jordan, Whitfield, and Zeigler-Hill (2007, see also Olson, Fazio, & Hermann, 2007). The authors posit that people can be consciously aware of their implicit self-esteem in the form of an intuitive global judgment. In four studies Jordan et al. (2007) demonstrated that people trusting in their intuitions exhibited stronger correlations between implicit and explicit self-esteem than people with lower faith in their intuitions.

For future research it might also be interesting to concentrate on the effects a particular manipulation has on nonverbal or on controlled behaviour, respectively, in addition to implicit or explicit self-esteem/attitudes. We would expect that manipulation methods influencing associations in memory (e.g., evaluative conditioning) can also influence nonverbal behaviour, whereas a manipulation method influencing propositional processes should be able to change controlled behaviour. In the context of implicit and explicit self-esteem, nonverbal

anxiety, self-handicapping and self-rated anxiety in a social interview situation could be interesting behaviours to study in more detail (see Spalding & Hardin, 1999).

Taken together, our results fit with the assumptions of recently proposed dual-process models, positing that implicit and explicit attitudes are the result of two qualitatively distinct kinds of mental processes reacting to different manipulation methods. Hence, these models seem to offer a convincing theoretical framework to integrate empirical findings of attitudinal dissociation and should be used to derive predictions for future work concerning attitude change.

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## Footnotes

<sup>1</sup> The terms were gut (good), fair (fair), froh (happy), warm (warm), zart (gentle), aktiv (active), human (human), schön (beautiful), gesund (healthy), heiter (cheerful), lustig (amusing), sozial (social), witzig (funny), ehrlich (honest), kreativ (creative). All of them were selected according to their valence from German norm tables (Hager & Hasselhorn, 1994).

<sup>2</sup> In all three experiments participants were additionally asked to complete a self-esteem version of the Single Target Implicit Association Test (see Wigboldus, Holland, & van Knippenberg, 2006) as well as a Name-Letter-Task (NLT; cf., Nuttin, 1985). However, since analyses using the ST-IAT and the NLT effects as the dependent measures yielded essentially the same results as analyses using the IAT effect, only the effects concerning the standard IAT are reported here (concerning the ST-IAT are not discussed here any further). The finding of corresponding effects in several implicit measures can be taken as evidence against an objection concerning a dissociation of different implicit measures.

<sup>3</sup> The positive words were wertvoll (precious), zufrieden (satisfied), angenehm (pleasant), sonnig (sunny), glücklich (happy), gut (sound). Negative words were nutzlos (useless), schlecht (bad), gierig (greedy), unangenehm (unpleasant), ungerecht (unjust), traurig (sad).

<sup>4</sup> The low internal consistency of the semantic differential to measure self-evaluations could not really be improved (from  $\alpha = .59$  to  $\alpha = .64$ ) by eliminating a single item. Given this low internal consistency we doubt the usefulness of this scale as a dependent variable in Experiment 3.

Table 1

*Means and Standard Deviations of Implicit and Explicit Self-Esteem Measures in Experiment 1.*

Dependent measures	Positive conditioning		Neutral conditioning	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Semantic differential	33.40	3.10	34.15	3.51
State-self-esteem	75.80	9.89	78.85	7.20
IAT-D-effect	0.72	0.22	0.57	0.21

Table 2

*Means and Standard Deviations of Implicit and Explicit Self-Esteem Measures in Experiment*

2

	Desirable		Desirable		Undesirable		Undesirable	
	features possess		features lack		features possess		features lack	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Semantic differential	35.30	2.54	32.50	2.82	31.70	4.78	33.55	2.68
State-self-esteem	78.45	7.67	75.10	10.83	71.45	14.34	80.55	7.83
IAT-D-effect	0.69	0.31	0.65	0.26	0.62	0.24	0.59	0.21

Table 3

*Means and Standard Deviations of Implicit and Explicit Self-Esteem Measures in Experiment*

3

	Positive		Positive		Neutral		Neutral	
	conditioning,		conditioning,		conditioning,		conditioning,	
	knowledge		feelings		knowledge		feelings	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Semantic differential	32.38	3.95	34.13	2.94	32.63	2.70	33.31	2.12
State-self-esteem	73.00	10.83	79.88	9.04	74.44	9.11	71.69	7.99
IAT-D-effect	0.68	0.21	0.63	0.17	0.50	0.29	0.51	0.29

## Figure Caption

*Figure 1.* Means of the state-self-esteem questionnaire in the four experimental groups (1 = desirable possess, 2 = desirable lack, 3 = undesirable possess, 4 = undesirable lack; pointed bars represent groups thinking about negative characteristics; striped bars represent groups thinking about positive characteristics.)

